

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) An electrochemical deposition chamber for depositing material onto microfeature workpieces, the chamber comprising:

a processing unit including a first flow system configured to convey a flow of a first processing fluid to a microfeature workpiece at a processing site;

a barrier unit having a first portion detachably mounted to the processing unit such that the barrier unit is below the processing unit and a second portion below the first portion, wherein the first portion has an upper region at the processing unit and a lower region canted at an angle, and wherein the second portion has an upper section at the lower region of the first portion;

an electrode unit releasably coupled to the second portion of the barrier unit such that the electrode unit is below the barrier unit and spaced apart from the processing unit, the electrode unit including an electrode compartment and a second flow system separate from the first flow system, the second flow system being configured to convey a flow of a second processing fluid through the electrode compartment;

a plurality of independent electrodes in the electrode compartment; and

a barrier between the lower region of the first portion of the barrier unit and the upper section of the second portion of the barrier unit, wherein the barrier is canted at the angle of the lower region of the first portion of the barrier unit and configured to inhibit selected matter from passing between the first and second processing fluids.

2. (Currently Amended) The chamber of claim 1 wherein:

the electrodes comprise a first electrode and a second electrode; and

the electrode unit further comprises a dielectric divider between the first electrode and the second electrode; and

the barrier extends over the first and second electrodes.

3. (Currently Amended) The chamber of claim 1 wherein:

the electrodes comprise a first electrode and a second electrode arranged concentrically with the first electrode; and

the processing unit further comprises a field shaping module, the field shaping module being composed of a dielectric material and having a first opening facing a first section of the processing site through which ions influenced by the first electrode can pass and a second opening facing a second section of the processing site through which ions influenced by the second electrode can pass; and

the first portion of the barrier unit has one first channel in fluid communication with the first opening of the field shaping unit and another first channel in fluid communication with the second opening of the field shaping unit, and the second portion of the barrier unit has second channels aligned with corresponding first channels of the first portion of the barrier unit.

4. (Currently Amended) The chamber of claim 1-3 wherein the barrier is a nonporous barrier extending across the first and second channels of the barrier unit that prevents nonionic species from passing between the first and second processing fluids.

5. (Currently Amended) The chamber of claim 1-3 wherein the barrier is a semipermeable barrier extending across the first and second channels of the barrier unit that allows either cations or anions to pass through the barrier between the first and second processing fluids.

6. (Currently Amended) The chamber of claim 1-3 wherein the barrier is a semipermeable barrier extending across the first and second channels of the barrier unit that separates the flow of the first processing fluid from the flow of the second processing fluid.

7. (Canceled)

8. (Original) The chamber of claim 1 wherein the barrier allows electrical current to pass therethrough in the presence of an electrolyte.

9. (Original) The chamber of claim 1 wherein:
the electrodes selectively induce corresponding electrical fields; and
the processing unit further comprises a field shaping module that shapes the electrical fields induced by the electrodes.

10. (Original) The chamber of claim 1 wherein:
the electrodes comprise a first electrode and a second electrode; and
the electrode unit further comprises a first electrical connector coupled to the first electrode and a second electrical connector coupled to the second electrode, the first and second electrodes being operable independently of each other.

11. (Original) The chamber of claim 1, further comprising:
the first processing fluid, wherein the first processing fluid has a concentration of between approximately 10 g/l and approximately 200 g/l of acid; and
the second processing fluid, wherein the second processing fluid has a concentration of between approximately 0.1 g/l and approximately 200 g/l of acid.

12. (Original) The chamber of claim 11 wherein the second processing fluid has a concentration of between approximately 0.1 g/l and approximately 1.0 g/l of acid.

13. (Original) The chamber of claim 1, further comprising:
the first processing fluid, wherein the first processing fluid has a first concentration of acid; and

the second processing fluid, wherein the second processing fluid has a second concentration of acid, the ratio of the first concentration to the second concentration being between approximately 1:1 and approximately 20,000:1.

14. (Currently Amended) The chamber of claim 1, further comprising a first quick-release mechanism securing the processing unit to the first portion of the barrier unit and a second quick release mechanism securing the electrode unit to the second portion of the barrier unit ~~wherein the barrier is canted relative to the processing unit to vent gas from the second processing fluid.~~

15. (Original) The chamber of claim 1, further comprising a barrier unit coupled to the processing and electrode units, the barrier unit including the barrier.

16. (Original) The chamber of claim 1 wherein:
the barrier includes a first side and a second side opposite the first side;
the first flow system is configured to flow the first processing fluid at least proximate to the first side of the barrier; and
the second flow system is configured to flow the second processing fluid at least proximate to the second side of the barrier.

17. (Original) The chamber of claim 1 wherein the electrodes comprise a pure copper electrode.

18. (Original) The chamber of claim 1 wherein the electrodes comprise a copper-phosphorous electrode.

19. (Currently Amended) An electrochemical deposition chamber for depositing material onto microfeature workpieces, the chamber comprising:

a head assembly including a workpiece holder configured to position a microfeature workpiece at a processing site and a plurality of electrical contacts arranged to provide electrical current to a layer on the workpiece; and

a vessel including (a) a processing unit for carrying one of a catholyte and an anolyte proximate to the workpiece, (b) an electrode unit having a housing ~~an upper portion canted relative to the processing unit and being~~ configured to carry the other of the catholyte and the anolyte and a plurality of electrodes including at least first and second electrodes in the housing proximate to the electrodes, ~~wherein the electrode unit has a plurality of electrodes~~, and (c) a barrier between the processing unit and the electrode unit to separate the catholyte and the anolyte, and wherein the barrier is being canted along the upper portion of the electrode unit at an angle from one side of the housing to the other side to block bubbles from the first and second electrodes from rising through the processing unit and allow the bubbles to migrate to a high side of the barrier.

20. (Original) The chamber of claim 19 wherein the barrier is a semipermeable barrier that allows either cations or anions to pass through the barrier between the first and second processing fluids.

21. (Canceled)

22. (Original) The chamber of claim 19 wherein the barrier is a nonporous barrier that separates a flow of the catholyte and a flow of the anolyte.

23. (Original) The chamber of claim 19 wherein:
the electrodes comprise a first electrode and a second electrode; and

the electrode unit further comprises a dielectric divider between the first electrode and the second electrode.

24. (Previously Presented) A tool for wet chemical processing of microfeature workpieces, the tool comprising:

a processing unit for conveying a first processing fluid to a microfeature workpiece; an electrode unit including a plurality of electrodes and being positioned below the processing unit;

a barrier unit mounted to a lower portion of the processing and an upper portion of the electrode unit, the barrier unit including a barrier, and the barrier unit being releasably attached to the electrode unit by a quick-release mechanism having a latch;

a first flow system for carrying the first processing fluid, the first flow system including a first portion in the processing unit and a second portion in the barrier unit in fluid communication with the first portion in the processing unit; and

a second flow system for carrying a second processing fluid at least proximate to the electrodes, the second flow system including a first portion in the electrode unit and a second portion in the barrier unit in fluid communication with the first portion in the electrode unit, wherein the barrier is between the first processing fluid in the first flow system and the second processing fluid in the second flow system.

25-32. (Canceled)

33. (Currently Amended) A system for wet chemical processing of microfeature workpieces, the system comprising:

a processing unit for conveying a first electrolyte to a microfeature workpiece;

a first reservoir in fluid communication with the processing unit, the first reservoir and the processing unit having a first volume being configured to carry a first volume of for the first electrolyte;

an electrode unit for carrying a second electrolyte and a plurality of electrodes proximate to the second electrolyte;

a second reservoir in fluid communication with the electrode unit, the second reservoir and the electrode unit having being configured to carry a second volume of for the second electrolyte, the first volume of the first electrolyte processing unit and the first reservoir being at least twice the second volume of the second electrolyte electrode unit and the second reservoir; and

a barrier between the processing unit and the electrode unit to divide the second electrolyte and the first electrolyte.

34. (Currently Amended) The system of claim 33 wherein the ratio of the first volume of the first electrolyte to the second volume of the second electrolyte is between approximately 1.52 0:1 and approximately 10:1.

35. (Original) The system of claim 33, further comprising:

the first electrolyte, wherein the first electrolyte has a concentration of between approximately 10 g/l and approximately 200 g/l of acid; and

the second electrolyte, wherein the second electrolyte has a concentration of between approximately 0.1 g/l and approximately 1.0 g/l of acid.

36. (Original) The system of claim 33, further comprising:

the first electrolyte, wherein the first electrolyte has a concentration of between approximately 10 g/l and approximately 50 g/l of copper; and

the second electrolyte, wherein the second electrolyte has a concentration of between approximately 10 g/l and approximately 50 g/l of copper.

37-52. (Canceled)